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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/845,694	04/30/2001	Yukihiro Matsumoto	4296-136 US	2658

7590 01/27/2005

MATHEWS, COLLINS, SHEPHERD & GOULD, P.A.  
SUITE 306  
100 THANET CIRCLE  
PRINCETON, NJ 08540

EXAMINER
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ZUCKER, PAUL A

ART UNIT	PAPER NUMBER
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1621

DATE MAILED: 01/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/845,694

Applicant(s)

MATSUMOTO ET AL.

Examiner

Paul A. Zucker

Art Unit

1621

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12 November 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) 9-14 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 8 is/are rejected.
- 7) ☒ Claim(s) 7 is/are objected to.
- 8) ☒ Claim(s) 1-14 are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 4/30/2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 4/30/01, 11/28/03.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election with traverse of Group II, claim 8 in the reply filed on 12 November 2004 is acknowledged. The traversal is on the ground(s) that a search of the invention of claim 8 would uncover the inventions of Groups I and III as well. This is not found persuasive because the methods of Groups I and II do not require the reactor system of invention Group III. The Examiner, however, agrees with Applicants that the inventions of Groups I and II may be examined together and hereby rejoins Groups I and II. Group III, claims 9-14 are hereby withdrawn from consideration by the Examiner as being drawn to a non-elected invention. The requirement is still deemed proper and is therefore made FINAL.

### ***Specification***

2. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.
3. The disclosure is objected to because of the following informalities: Page 8, line 1: the specification refers to "Example 1". There does not appear to be an "Example 1" set forth. Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-6 are rejected under 35 U.S.C. 102(b) as being anticipated by Yamamoto et al (GB 1,089,353 11-1967). Yamamoto discloses (Fig. 1) a process for using a synthesis reaction apparatus that comprises a shell-and-tube type of reactor. Yamamoto discloses (lines 110-119) using preheated un-reacted gas to startup the reactor. Yamamoto discloses un-reacted gas temperatures of 330-450°C that reach a temperature of 490°C at the gas inlet of the catalyst tubes after being heated in the chamber containing the reaction tubes. Although Yamamoto is silent with regard to the solid point of the un-reacted gas the Examiner presumes that a medium having a solid point at 50-250° could be circulated at the temperatures (330-450°C) employed by Yamamoto.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 1621

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35

U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 1-6 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto et al (GB 1,089,353 11-1967) in view of Eden (US 3,634,502 01-1972).

Instantly claimed is a method for starting up a shell-and-tube reactor characterized by introducing a gas of a temperature in the range of 100 – 400°C into the reaction tubes. Further claimed is a process for production of (meth)acrylic acid using the reactor startup process.

Yamamoto teaches (Fig. 1) a process for using a synthesis reaction apparatus that comprises a shell-and-tube type of reactor. Yamamoto teaches (lines 110-119) using preheated un-reacted gas to startup the reactor. Yamamoto teaches un-reacted gas temperatures of 330-450°C that reach a temperature of 490°C at the gas inlet of the catalyst tubes after being heated in the chamber containing the reaction tubes. Although Yamamoto is silent with regard to the solid point of the un-reacted gas, the Examiner presumes that a medium having a solid point at 50-250° could be circulated at the temperatures (330-450°C) employed by Yamamoto.

The difference between the process taught by Yamamoto and that instantly claimed is that Yamamoto does not appear to contemplate the application of his/apparatus/process to the synthesis of acrylic acid.

Eden, however, teaches (Column 1, lines 36-47) a process for the oxidation of isopropylene or isobutylene to acrylic acid. Eden teaches (Column 2, lines 64-72) the use of a fixed reactor bed in a tube reactor. Eden further teaches (Column 3, lines 64-72) preheating the reaction tube to 285 °C with steam at prior to conducting the reaction at temperatures of from 385-400°C. Eden also teaches (Column 2, lines 67-69) the use of heating coils to heat the reaction tube.

Thus one of ordinary skill in the art would have been motivated to employ the apparatus/process of Yamamoto in order to carry out the oxidation of propylene or isobutylene to give the corresponding acrylic acids for the following reasons:

- a. Using the multiple tubes of a shell-and-tube reactor as taught by Yamamoto would allow one of ordinary skill in art to carry out the oxidation reaction of Eden on an industrial scale; and
- b. The use of Yamamoto's apparatus would obviate the need for the heating coils (and their attendant expense) of Eden since the heat of reaction is used to maintain reaction temperature.

There would have been a reasonable expectation for success based upon the similar requirements for the oxidation processes of both Yamamoto and Eden.

Thus the instantly claimed process would have been obvious to one of ordinary skill in the art.

### ***Claim Objections***

6. Claim 7 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### ***Allowable Subject Matter***

7. Claim 7 is drawn to allowable subject matter. The following is a statement of reasons for the indication of allowable subject matter: The process taught Yamamoto et al (GB 1,089,353 11-1967) employs un-reacted starting materials as a heat transfer medium. This medium is eventually supplied to, and consumed in, the reaction. One of ordinary skill in the art would not therefore have been motivated to replace the heat transfer medium of Yamamoto with an extraneous material unsuitable for use in the reaction itself. The instantly claimed process is therefore patentable over Yamamoto et al (GB 1,089,353 11-1967) and Eden (US 3,634,502 01-1972), the closest prior art.


### ***Conclusion***

8. Claims 1-14 are pending. Claims 1-6 and 8 are rejected. Claim 7 is objected to. Claims 9-14 are held withdrawn from consideration as being drawn to a non-elected invention

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Paul A. Zucker whose telephone number is 571-272-0650. The examiner can normally be reached on Monday-Friday 7:00-3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Johann R. Richter can be reached on 571-272-0646. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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Paul A. Zucker, Ph. D.  
Primary Examiner  
Technology Center 1600